NSF PERSPECTIVE

PLANETARY SCIENCES DECADAL SURVEY
Giant Planets/Satellites Panels
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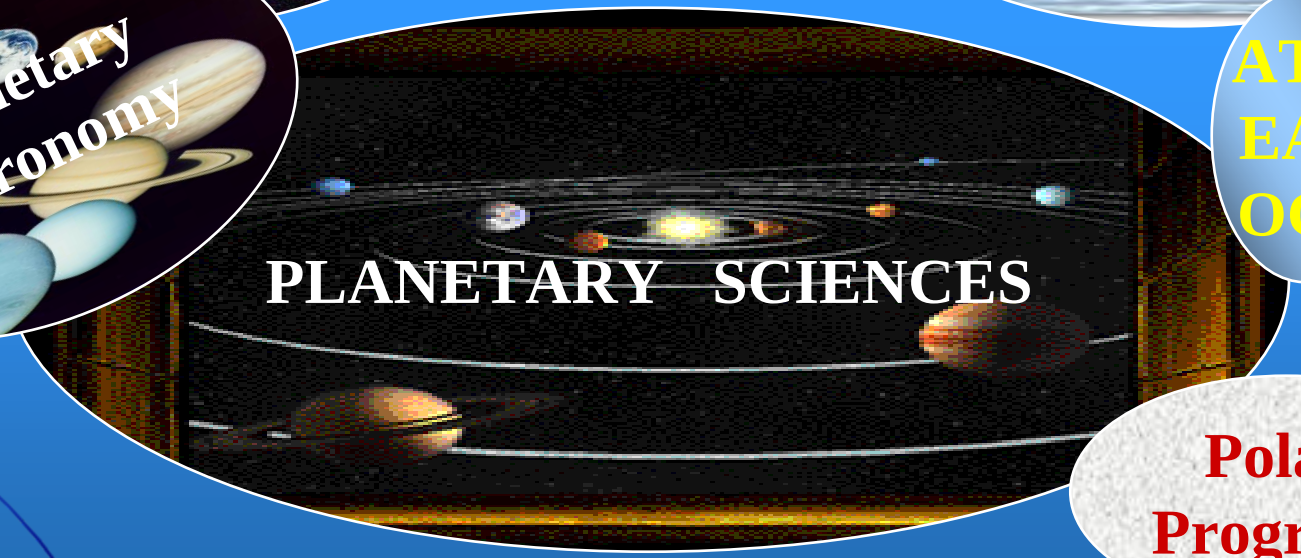
Scope
! Planetary Sciences !

- Solar System Phenomena, encompassing
  - Space exploration
  - Ground-based astronomy
    - Observational programs
    - Instrumentation
    - Facilities
  - Theory/modeling/simulations
  - Laboratory

NSF supports all areas

- Space exploration – archived data
- Ground-based astronomy – national & international observatories
- Individual investigator awards
  - Observations
  - Instrumentation
  - Theory/modeling/simulations
  - Laboratory

Planetary Sciences at NSF



ATM
EAR
OCE
➡ AGS

Polar Programs

Planetary Sciences at NSF

Office of Polar Programs

- U.S. Antarctic Meteorite Program
  - NSF, NASA, Smithsonian Institution
  - NSF/OPP -- ~$100,000 per year
- Individual Investigator Awards
  - geomorphology in the Dry Valleys
    - terrestrial analogs to ancient Mars

Planetary Sciences at NSF

Directorate for Geosciences

- Atmospheric Sciences – ATM
- 10/09 – Atmospheric and Geospace Sciences – AGS
  - planetary magnetospheres
  - planetary atmospheres
  - Solar, heliospheric & interplanetary environment (SHINE)
  - Solar-terrestrial
- Earth Sciences -- EAR
  - meteorites
- Ocean Sciences -- OCE
  - ocean ice

Division of Astronomical Sciences (AST)
Astronomy & Astrophysics Research Grants (AAG)

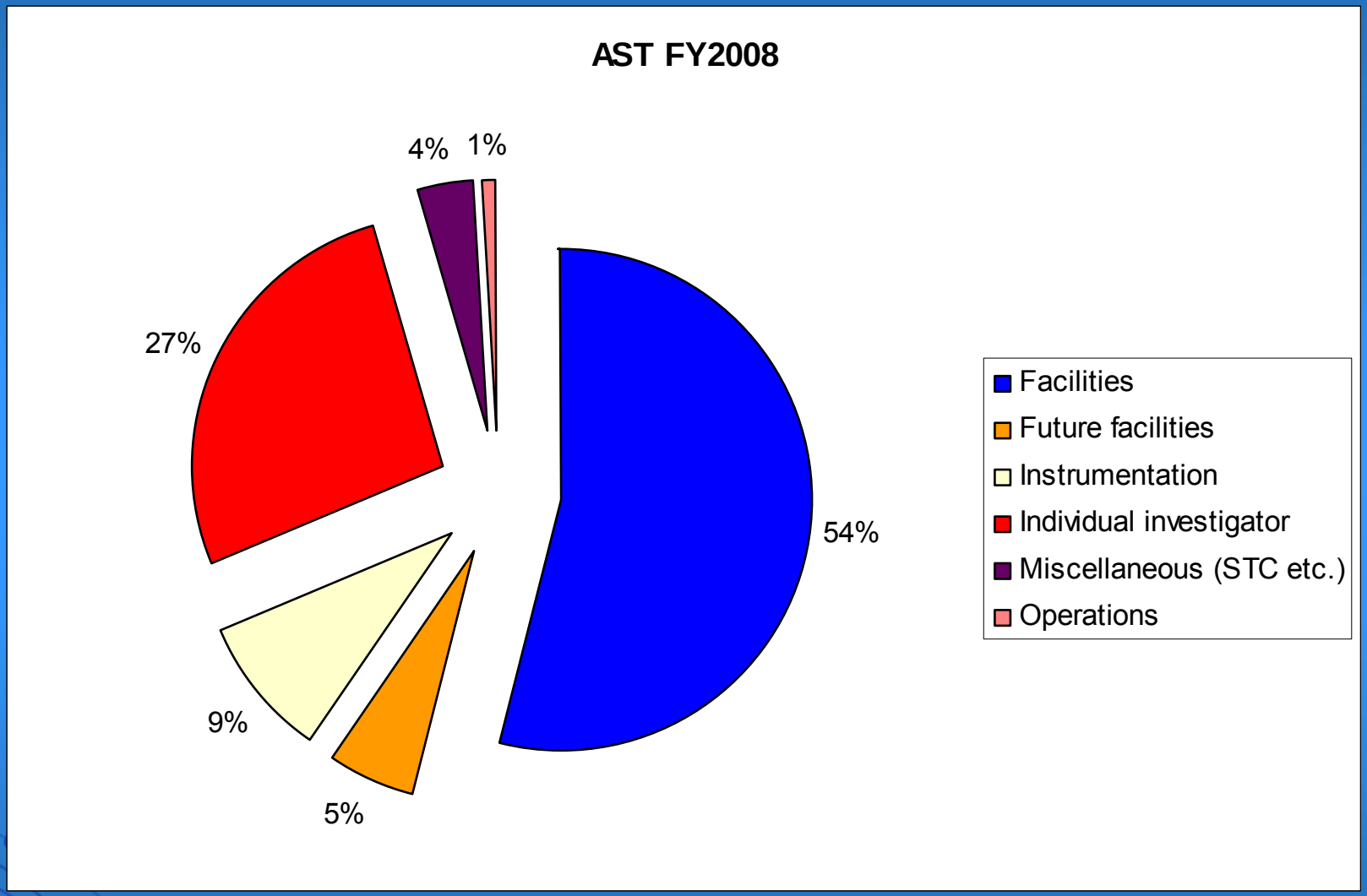
- focus is on scientific merit / broader impact of a proposed project
- search for potentially transformative research
- no predetermined topic or technique or facility for preferential treatment

Planetary Astronomy Theme

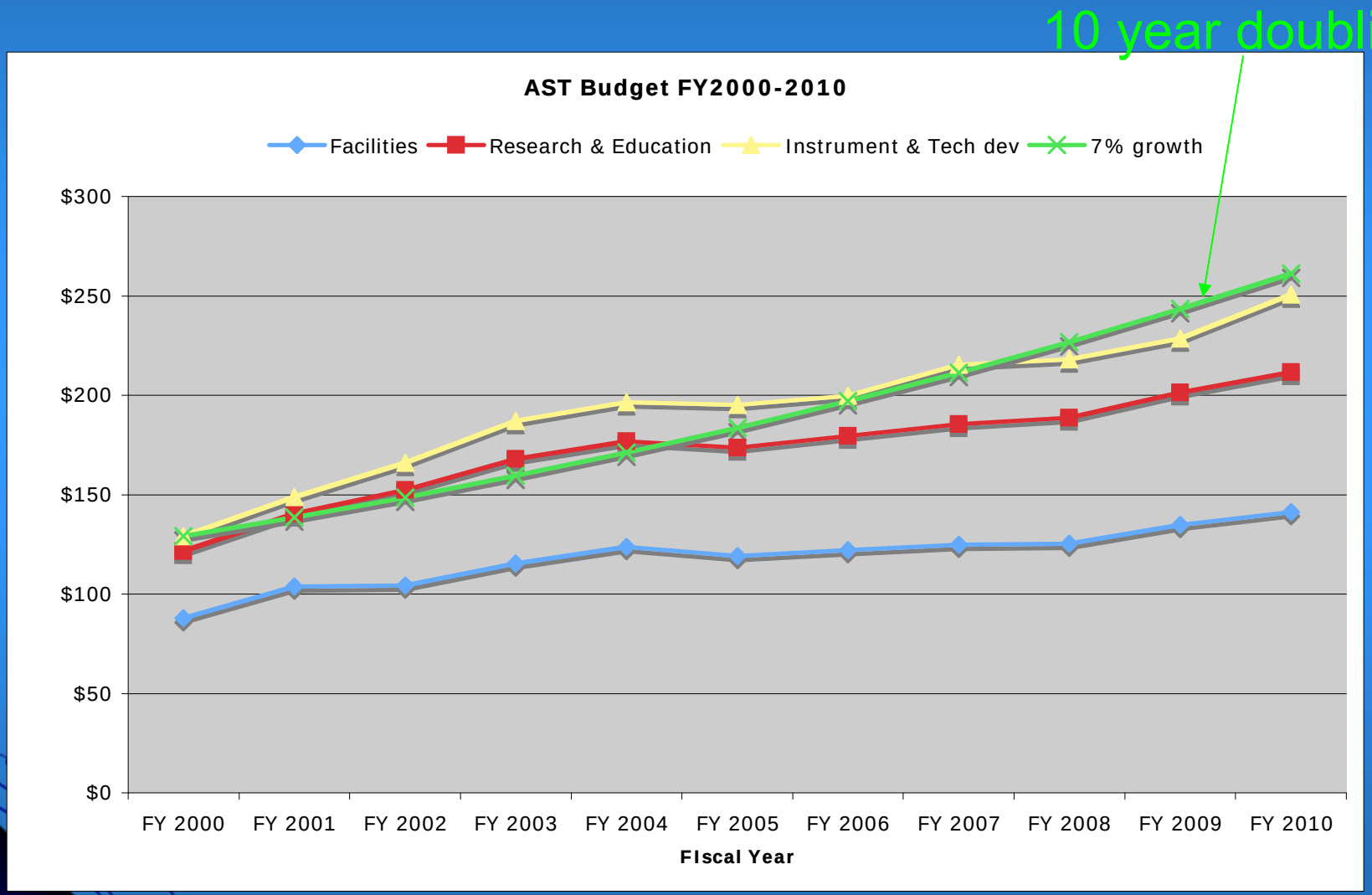
Individual investigator awards for theoretical, observational, and laboratory studies of the Solar System ---

- Structure and Composition of Planetary Interiors, Surfaces, and Atmospheres
- Planetary Satellites
- Comets and Asteroids
- Trans-Neptunian / Kuiper Belt Objects
- Inter-Planetary Medium
- Solar System Origins and Evolution

- typical award: $95,000 to $125,000 per year for 3 years (08 mean $108k)
- can be more (or less!); can be for 5 years (very rarely longer)


AST FY2008
4%
1%
27%
54%
9%
5%
Facilities
Future facilities
Instrumentation
Individual investigator
Miscellaneous (STC etc.)
Operations

AST Budget trends



National Observatory Facilities
Public-Private Coordination

- **Decadal Survey: a single integrated system using both federal and non-federal funding for ground-based optical and infrared facilities**
- Programs through NOAO:
  - The Ground-Based O/IR System – workshops, reports
  - NSF funding for the Telescope System Instrumentation Program
  - Originally Adaptive Optics Development Program (now in NSF ATI program)
  - ReSTAR and ALTAIR reports and planning
- Infrastructure support for private facilities (e.g. Keck laser AO)
- Future projects required, or encouraged, to be partnerships (LSST, GSMT)

- **Radio facilities handled differently**
- University Radio Observatories (NSF/university partners)
- Future projects required, or encouraged, to be partnerships (MWA, SKA)

National Observatory Facilities

- Gemini Observatory
  - International partnership, forefront, twin N-S
- National Optical Astronomy Observatory
  - Kitt Peak National Observatory/Cerro Tololo Interamerican Obs.
  - O/IR system; TSIP; US Gemini; LSST; TMT
- National Radio Astronomy Observatory
  - Expanded Very Large Array; Green Bank Telescope; VLBA
  - Atacama Large Millimeter-submillimeter Array
- University Radio Observatories
  - Operations, equipment at existing facilities; maybe new facilities
- National Solar Observatory
  - McMath-Pierce; SOLIS; Sacramento Peak; ATST
- National Astronomy and Ionosphere Center

National Observatory Facilities

National Astronomy & Ionosphere Center, Arecibo, Puerto Rico

- Astronomy:
  - 305m Radio/Radar Telescope
  - 1 MW S-band Planetary Radar, would not exist w/o NASA
- Atmospheric Science:
  - 430 MHz incoherent scatter radar on Antenna
  - Numerous LIDARs, OIR Imagers
- Education / Outreach:
  - Arecibo Observatory Visitor and Education Facility

National Observatory Facilities

National Astronomy & Ionosphere Center, Arecibo, Puerto Rico

- Senior Review: reduce AST support
  - Cost reviews of all facilities by outside contractor
  - Recommended by Senior Review, to set sensible operations levels
- New cooperative agreement; solicitation “imminent”
  - See Dear Colleague letter at NSF/AST web site
  - Agreed between AST and ATM [AGS]
  - Base budget that keeps the facility open and viable
  - Does not support everything it currently does
  - Requires reduced scope or additional non-NSF funding

From the Statement of Task
B. National Science Foundation Recommendations

- For NSF, the survey and report shall encompass all ground-based observational techniques, as well as analysis of data collected and relevant laboratory and theoretical investigations (including modeling and simulation). Thus, the study will assess the NSF-supported infrastructure of the field, including research and analysis support, the educational system, instrumentation and technology development, data distribution, analysis, and archiving, theory programs, and so on. The Committee shall also recommend any changes to this infrastructure that it deems necessary to advance the science and to capture the value of facilities in place.

CONCLUSIONS

- Decadal survey for **Planetary Sciences**
  - Space exploration
  - Ground-based astronomy
  - Theory/modeling/simulations
  - Laboratory
- Coordinate with Astronomy & Astrophysics Decadal Survey, ASTRO2010
- Balance, and possibly tension, between existing and new capabilities
- Questions?